



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE
AMERICAN NATURALIST

VOL. XXVI.

January, 1892.

301

ON SOME CAUSES WHICH INFLUENCE TOPOGRAPHICAL CHANGES AND GEOLOGICAL FORMATIONS
IN THE CHANNEL ISLANDS OF CALIFORNIA.

BY DR. LORENZO GORDIN YATES.

During a recent visit to San Miguel, the most westerly of the so-called "Channel Islands," off the coast near Santa Barbara, my attention was attracted to phases of the history of the island, which proved intensely interesting.

The general trend of the coast of California is north-west and south-east, but at Point Conception, about 240 miles south-easterly from San Francisco, the direction changes to east and west, and this bend, with the chain of islands distant about 25 miles, forms the Santa Barbara Channel, running parallel with the Santa Ynez Mountains.

These islands are notable from their having furnished shelter to the ships of their discoverers, the old Spanish navigators commanded by the Portuguese, Cabrillo, who died in about the year 1543, and whose body is supposed to have been buried on San Miguel.

The islands east of San Miguel, are Santa Rosa; Santa Cruz; and the Anacapas.

They are separated from each other by channels of from four to five miles in width; they are of eruptive origin, and their areas are principally occupied by a range of low mountains running parallel with the Santa Ynez Mountains,

and with the coast, forming the longer axis of each of the islands above named.

The prevailing winds of the coast, except in January and December, come from the northwest, and form such a reliable meteorological feature as to be called "The Summer trade Winds." Back of the Coast Ranges of Mountains these winds are scarcely perceptible, except where there is a depression in the highlands upon the coast, where the sea breeze rushes in to fill the partial vacuum caused by the rising of the heated air of the valleys. In these instances the portion of the wind-force deflected from its general direction, follows up the line of the main valley and its tributaries, its force being rapidly diminished as it recedes from the main current.

These deflections are apparent at the Golden Gate; the Pajaro and Salinas rivers; the Santa Ynez and Santa Clara Valleys, and various other points north and south.

At Point Conception the mountains extend to the coast, and if the depression forming the Channel were a heated valley, it would draw a large portion of the current of cold, fog-laden wind to replace its over-heated atmosphere. The cool, temperate, sea-filled Channel offering no such conditions, the wind continues its course, without obstruction, across the mouth of the Channel, a small portion only being deflected in an easterly direction. This follows the Santa Barbara Channel with rapidly decreasing force, and long before it reaches Santa Barbara it is represented by a gentle westerly breeze, of which sailing vessels take advantage in making their runs to and fro, between the mainland and the islands.

The main current of wind continues on its course in the direction of San Miguel and Santa Rosa Islands which it sweeps with unabated force, carrying the dry sand from the windward shores and dispersing it in the form of drifts over the entire surface; and I have been at the west end of Santa Rosa Island when the sand was being blown over from San Miguel like a drifting snow storm, over a distance of fully four miles of intervening waters.

These islands were formerly covered by a dense growth of vegetation, and densely populated by aborigines, but since the

advent of the whites, the aboriginal tribes have become extinct, and the introduction of sheep and cattle, to the pasturage of which they have been entirely devoted for many years, has so far destroyed the vegetation as to render a large proportion of some of the islands barren wastes, and land which formerly supported hundreds or thousands of human beings, is fast becoming occupied by shifting sands of no value whatever.

The principal cause of this desolation is the destruction of the plants by sheep; the thick carpeting of the seashore by *Mesembryanthemums* and other succulent plants kept the sands confined to the immediate shore line, and trees, shrubs, herbaceous plants and creepers served to protect the soil from the destructive agency of the wind and rain; whereas, large areas of the surface now show no evidence of its former condition other than the presence of countless thousands of the dead shells of a snail peculiar to these islands (*Helix ayresiana* Newc.), the bleaching bones of the aborigines, and the vast accumulations of the refuse of their camps, together with the casts of dead trees and shrubs, whose places in the soil appear to have been filled by concretionary columns of sandstone which stand erect, sometimes projecting from two to four feet above the present surface, like gravestones in a cemetery, showing how the soil in which they grew has been blown away. These again will be covered by sand dunes, which may eventually become solid rock and puzzle geologists of future ages.

These casts appear to have been formed by sand falling into the cavities in the soil, the latter having become hardened by exposure to the action of wind and sun, when deprived of the protection of the growth of vegetation; the dead roots of the shrubs decayed, leaving their impress in the mold; these molds filled with sand during the dry season, would, during the rainy season, hold the water which, filling the interstices, furnished the mineral substance which cemented the grains of sand into a solid mass.

On the northeasterly shore of San Miguel Island is a crescent-shaped harbor, protected from the northwest winds by a ridge of basaltic rock, called Harris Point, which forms the

northern extremity of the island; over this point the wind sweeps with great force, carrying the sand mixed with fragments of shells, *Helix ayresiana*, marine shells and other debris from the rancherias, &c.

The sand beach forming around Cuylers Harbor, above referred to, is composed of sand with a large proportion of fragments of the land shell, and a small proportion of those of marine origin.

Santa Barbara, California,

August 16th, 1891.